ELECTRONIC IMAGING APPARATUS

JAPAN PATENT OFFICE
PUBLICATION OF LAID-OPEN SMALL PATENT APPLICATION (U)
Publication number : H3-94879
Date of publication of application : 27.09.1991
Int.CI[5].
H 04 N 5/225

In house reference number: F1
8942-5C
Examination is not requested yet.
The number of claims: 2 (total page)
TITLE OF INVENTION : ELECTRONIC IMAGING APPARATUS
APPLICATION NUMBER : H2-3312
DATE OF FILING : 18.01.1990
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SPECIFICATIONS

1. Title

electronic imaging apparatus

2. Claim

[Claim 1]

An electronic imaging apparatus comprising:

a finder optical system including a second optical path branching off from a first optical path composing an imaging optical system for forming a subject image on an imaging surface of an image pick-up device, wherein

the second optical path is set substantially along a direction of a plane surface including a lateral scanning direction of the image pick-up device and an optical axis direction of the first optical path.

[Claim 2]

The electronic imaging apparatus set forth in claim 1, wherein a predetermined part of the second optical path is constructed

so as to pass through a space between predetermined component blocks inside the electronic imaging apparatus.

3. [Detailed description of the Invention]

[Field of the small Invention]

The present small invention relates to an electronic imaging apparatus, and more particularly, to a layout of a finder optical system in the electronic imaging apparatus using an image pick-up device.

[Conventional prior art]

Recently, many electronic still cameras of the single lens reflex-type electronic imaging apparatus using the solid-state image pick-up device such as CCD, etc or the video cameras have been developed and marketed because of excellence in terms of quick response, convenience or portability. An arrangement of its finder, storage device, or battery box, etc from the viewpoint of the handling quality or the portability becomes vital. As the typical construction and arrangement (layout) of the conventional electronic still camera are shown in Fig. 4, a ray of imaging light is taken in via taking lens 51, and a part of the imaging light is transmitted by half mirror 52, and is formed on image pick-up device 53. And, another part of the imaging light is reflected upward on half mirror 52, and is formed on a matte (not shown herein). Then, this imaging light is reflected by mirror 57 as a finder light, and is entered into finder 58. Finder 58 is arranged in an upper position of battery box 54 and storage medium device 55 which are laterally arranged behind CCD 53. Thus, minimum limit dimension H_1 of a height of still camera body 59 is determined by a position of electric circuit board 56 arranged beneath storage medium device 55 and finder 58.

[Problems to be solved by the small Invention]

However, in the abovementioned conventional electronic still camera, in relation to thinness for further improving the portability or the handling capability, it is impossible for limit dimension H_1 to fall below a certain value because the finder is arranged in the upper position of the storage medium

device and the battery box.

In order to solve this inconvenience, the present small invention is aimed at achieving the thinness as a camera by efficiently laying out the finder with respect to other components, and providing an electronic imaging apparatus excellent in the portability and easy to handle.

[Means for solving the inconvenience]

An electronic imaging apparatus of the present small invention includes a finder optical system having a second optical path branching off from a first optical path composing an imaging optical system for forming a subject image on an imaging surface of an image pick-up device, wherein the second optical path is set substantially along a direction of a plane surface including a lateral scanning direction of the image pick-up device and an optical axis direction of the first optical path.

[Example embodiments]

The present small invention will be described below in accordance with an example embodiment shown by diagrams. Fig. 1 is a perspective view of a layout of an electronic still camera of an electronic imaging apparatus showing one example embodiment of the present small invention. On a first optical path along imaging light axis 0 are lied out shooting lens 1, half mirror 2, and image pick-up device 3 of a solid-state image pick-up device having a photoelectric conversion surface on which a part of a transmitted light via half mirror 2 is formed, which compose an imaging optical system. The part of the image light is reflected toward optical axis 0′ on half mirror 2 as the finder light, and is formed on the matte (not shown herein). And, the image-formed light is further reflected toward finder 5 of optical axis 0′′ by mirror 4. An optical path of the finder light along optical axes 0′ and 0′′ is referred to as a second optical path. And, the matte (not shown herein), mirror 4 and finder 5 compose a finder optical system. And, the second optical path is set along lateral scanning direction X of a photoelectric conversion of image pick-up device 3 and optical axis 0.

Component blocks of an imaging apparatus which are battery

box 7 at a rear of image pick-up device 3 (viewed from a subject side), and electromagnetic storage device 6 similarly at the rear thereof on a right side are lied out apart at a predetermined space, and finder 5 is lied out between the space between battery box and electromagnetic storage device 6. With such the layout, as storage medium 9 can be inserted into electromagnetic storage device 6 from a left side when viewing from a photographer side, ease-of-use inconvenience does not arise. Also, electric circuit board 8 is lied out beneath each component block.

Minimum limit dimension H_2 of a height of camera body 10 of the electronic still camera of the example embodiment constructed in such the way is determined by a sum of a height itself of a single component, for example, storage device 6 or battery box, etc, and a width of board 8, and then the constructional minimum dimension can be obtained. Thus, minimum limit dimension H_2 is markedly smaller than dimension H_1 of the body height of the conventional example given in the above, so this makes it possible to achieve a camera with a thinned flat-type layout.

Next, a layout of a finder optical system of a camera of an electronic imaging apparatus showing an example variation of the example embodiment will be described referring to Fig. 2. In this example variation, a layout when electromagnetic storage device 6 and battery box 7 compose an adjacent unit construction is shown. As shown in the diagram, a finder light is reflected toward a left direction by half mirror 4 when viewing from a subject side. Then, the finder light enters into finder 5 arranged close to a left side of storage device 6 and battery box 7 of the unit construction. Even in this example variation, the storage medium can be inserted into storage device 6 from the left side in the same way as the example embodiment given in the above when viewing from the photographer side. The layout of other components is the same as the abovementioned example embodiment.

Even in the example variation as constructed in the above, the limit dimension of an exterior height of the camera becomes

H_2, thereby achieving thinness.

Furthermore, as a layout of a finder optical system of a camera showing another example variation of the example embodiment, the layout shown in Fig. 3 can be proposed. This example variation is a layout in accordance with the same idea as the example variation, and finder 5 is arranged close to a right side (viewed from the subject side) of storage device 6 and battery box 7 of the unit construction. In this case, it is necessary to provide a medium insertion slot of electromagnetic storage device 6 on the photographer side, or to a left side of the photographer by exchanging the layout position of box 7 and storage device 6. And then minimum limit dimension H_2 of an exterior height of this example variation become also equal to the previous mentioned example embodiment.

Of course, it is possible to substitute a solid-state memory storage device for electromagnetic storage device 6. Furthermore, even if image pick-up device 3 is arranged by rotating a layout direction of the example embodiment at 90 degrees of angle around the optical axis, and a vertical scanning direction is dealt with instead of lateral scanning direction X, a purpose of the present small invention can be applied intact. And, in the above description, the example embodiment that embodies the present small invention as a so-called front loading type device loading the storage medium from the insertion slot without opening FDD sector (deck sector) of the storage device is detailed, but, of course, it is possible to have the same effect even when the present small invention is embodied as a so-called top loading device loading the storage medium by temporarily opening a storage medium holding sector of the FDD sector. Also, the present small invention can be applied to not only the electronic still camera but also the video camera, etc.

[Effect of the small Invention]

As described in the above, since the electronic imaging apparatus of the present small invention lays out the finder optical system along the plane surface formed by the optical

axis of the imaging optical system and the lateral scanning direction, according to the present small invention, the external height of the imaging apparatus is determined by the single height of each component block, thereby providing the electronic imaging apparatus having characteristics in that the thinness of the apparatus is achieved, and the portability is improved without reducing each function, and the ease-of-use is enhanced.

4. Brief explanation of diagrams]

Fig. 1 is a perspective view showing the layout of the electronic still camera of the electronic imaging apparatus showing the one example embodiment of the present small invention.

Fig. 2 is a perspective view showing the layout of the electronic still camera of the electronic imaging apparatus showing the example variation of Fig.1.

Fig. 3 is a perspective view showing the layout of the electronic still camera of the electronic imaging apparatus showing another example variation of Fig.1.

Fig. 4 is a perspective view showing the layout of the electronic still camera of the conventional example.

1 SHOOTING LENS

2 HALF MIRROR

3 IMAGE PICK-UP DEVICE

THE BOVE COMPOSES SHOOTING OPTICAL SYSTEM

4 MIRROR

5 FINDER

THE ABOVE COMPOSES FINDER OPTICAL SYSTEM

0 IMAGING OPTICAL AXIS (OPTICAL AXIS OF FIRST OPTICAL PATH)

0′, 0′′ FINDER OPTICAL AXIS (OPTICAL AXIS OF SECOND OPTICAL PATH)

LATERAL SCANNING DIRECTION X

⑲日本国特許庁（JP）　⑪実用新案出願公開

⑫公開実用新案公報（U）　平3−94879

⑤Int. Cl.⁵	識別記号	庁内整理番号	㊸公開　平成3年(1991)9月27日
H 04 N 5/225	B	8942−5C	

審査請求　未請求　請求項の数 2　（全2頁）

㊹考案の名称　電子的撮像装置

㉑実　願　平2−3312
㉒出　願　平2(1990)1月18日

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㊼実用新案登録請求の範囲

(1) 撮像素子の撮像面に被写体像を結ぶための撮像光学系を成す第1の光路から分岐してなる第2の光路を含んで構成されたファインダ光学系を有する電子的撮像装置であつて、

上記第2の光路は上記撮像素子の水平走査方向と上記第1の光路の光軸方向とを含む平面に実質的に沿う方向に設定されてなるものであることを特徴とする電子的撮像装置。

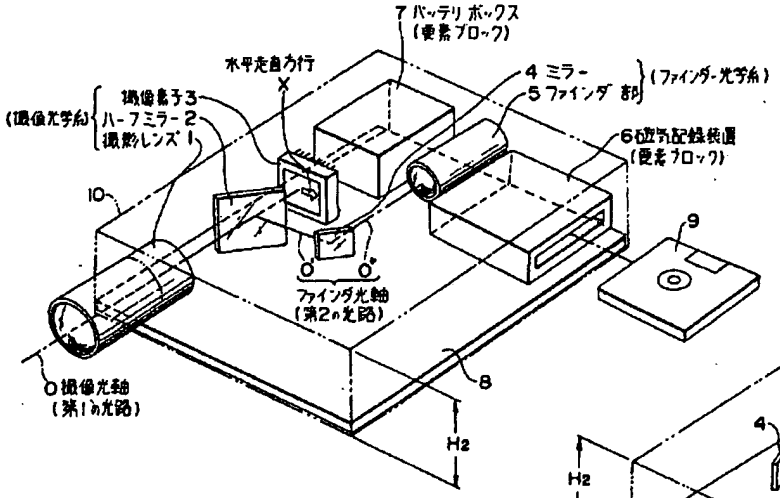
(2) 上記第2の光路の所定部は本電子的撮像装置内の所定の要素ブロック間の間隙を通るように構成されてなるものであることを特徴とする請求項1記載の電子的撮像装置。

図面の簡単な説明

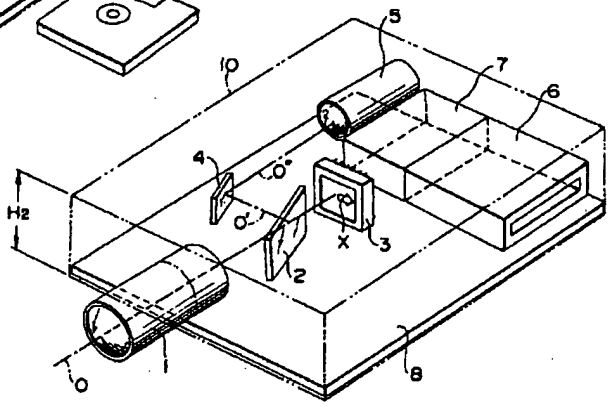
第1図は、本考案の一実施例を示す電子的撮像装置である電子スチルカメラの配置を示す斜視図、第2図は、上記第1図の実施例の変形例を示す電子スチルカメラの配置を示す斜視図、第3図は、上記第1図の実施例の別の変形例を示す電子スチルカメラの配置を示す斜視図、第4図は、従来例の電子スチルカメラの配置を示す斜視図である。

｛1……撮影レンズ、2……ハーフミラー、3……撮像素子｝（撮像光学系）、｛4……ミラー、5……ファインダ部｝（ファインダ光学系）、O……撮影光軸（第1の光路の光軸）、O′，O″……ファインダ光軸（第2の光路の光軸）。

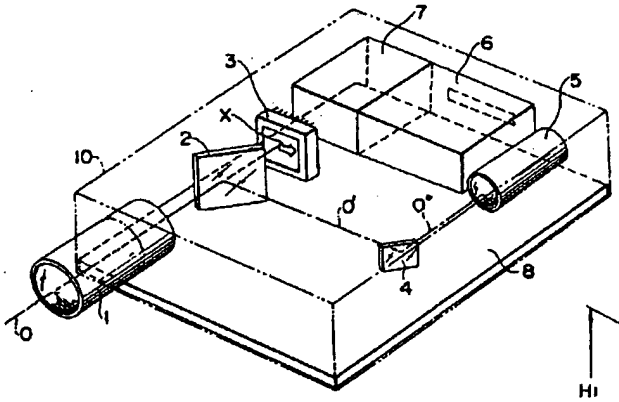
第１図



第２図



第３図



第４図